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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,570	11/26/2003	Akira Tanaka	81788.0263	8635
26021	7590	01/20/2006	EXAMINER	
HOGAN & HARTSON L.L.P. 500 S. GRAND AVENUE SUITE 1900 LOS ANGELES, CA 90071-2611			VAN ROY, TOD THOMAS	
			ART UNIT	PAPER NUMBER
			2828	

DATE MAILED: 01/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/724,570	Applicant(s) TANAKA ET AL.	
	Examiner Tod T. Van Roy <i>T. Van Roy</i>	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11/26/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of claims 1-18 in the reply filed on 11/08/2005 is acknowledged.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

Figure 8 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities:

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Page 21 of the specification describes fig.3d as having a width of the upper edge between 70–100% of the width of the lower edge (lines 15-22), but this is not possible if the width of the upper edge is greater than the width of the lower edge.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 18 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The applicant elected the species relating to figs. 1-3, and the limitation found in claim 18 dealing with the use of dielectric current confinement regions, is only described in the specification with regards to a non-elected fig. 4 (pg.26 lines 11-24).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

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applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2, and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Abe (US 6757311).

With respect to claim 1, Abe discloses a semiconductor laser element that exhibits self-sustained pulsation (col.6 lines 1-12) in a predetermined output region, said semiconductor laser element comprising: a substrate (fig.1a #30); a first conductive type clad layer formed on said substrate (fig.1a #37 n); an active layer formed on said first conductive type clad layer for emitting light by current injection (fig.1a #38); a second conductive type first clad layer formed on said active layer (fig.1a #39 p); and a stripe-shaped second conductive type second clad layer formed on said second conductive type first clad layer (fig.1a #41 p) in a first direction, in such a manner that the cross-sectional surface of said stripe-shaped second conductive type second clad layer in a direction perpendicular to said first direction has a shape having an upper edge and a lower edge that face each other and side edges that connect between said upper edge and said lower edge, where the minimum width thereof is at least 70% but no more than 100% of the maximum width (fig.1b, #41 upper edge greater than 70% but less than 100% of the lower edge).

With respect to claim 2, Abe discloses the shape of the cross-sectional surface of the stripe shaped second conductivity type second clad layer is a shape such that the width of said upper edge is less than the width of said lower edge, and said side edges widen from said upper edge to said lower edge (fig.1b #41).

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With respect to claim 5, Abe discloses the width of the lower edge of said stripe-shaped second conductive type second clad layer is at least 3 μm (col.8 lines 26-32, width of lower edge is greater than SW which is taught to be from 1.5-5 μm).

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Ohya et al. (US 2001/0043632).

With respect to claim 1, Ohya discloses a semiconductor laser element that exhibits self-sustained pulsation (abs.) in a predetermined output region, said semiconductor laser element comprising: a substrate (fig.1 #101); a first conductive type clad layer formed on said substrate (fig.1 #103 n); an active layer formed on said first conductive type clad layer for emitting light by current injection (fig.1 #104); a second conductive type first clad layer formed on said active layer (fig.1 #105 p); and a stripe-shaped second conductive type second clad layer formed on said second conductive type first clad layer (fig.1 #108 p) in a first direction, in such a manner that the cross-sectional surface of said stripe-shaped second conductive type second clad layer in a direction perpendicular to said first direction has a shape having an upper edge and a lower edge that face each other and side edges that connect between said upper edge and said lower edge, where the minimum width thereof is at least 70% but no more than 100% of the maximum width (fig.1, #108 upper edge is substantially equal to the lower edge).

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With respect to claim 4, Ohya discloses the cross-sectional surface of the stripe-shaped second conductive type second clad layer has a shape such that the width of said upper edge is equal to the width of said lower edge, and each of said side edges has an upper side edge portion that descends in a manner that narrows inward from said upper edge towards said lower edge and a lower side edge portion that extends from that upper edge portion to said lower edge (fig.1 #108).

With respect to claim 9, Ohya discloses the angle between each of said edges and said lower edge of said stripe shaped second conductive type second clad layer is at least 70 degrees but no more than 100 degrees at a portion that is at least 60% of the upper side of said stripe-shaped second conductive type second clad layer (edges of #108 are substantially 90 degrees).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 6-8, and 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe.

With respect to claim 6, Abe teaches the laser device as outlined in the rejection to claim 1, as well as the use of a material, in a second device structure, to emit light at 780nm. Abe does not teach the material to be used in the first embodiment, which discloses claim 1, or that the material be $\text{Al}(y)\text{Ga}(1-y)\text{As}$ ($0 \leq y \leq .2$) or the thickness to be at least 20 but no more than 60 nm. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the material of Abe emitting at 780nm with the first structure of Abe in order to induce self-pulsation and reduce feedback noise in a frequency usable with CD's (Abe col.1 lines 25-37), as well as to use a material of $\text{Al}(y)\text{Ga}(1-y)\text{As}$ ($0 \leq y \leq .2$) or the thickness to be at least 20 but no more than 60 nm, since the wavelength taught by Abe is emitted by this material, and the composition and thickness would be obvious optimizations of the taught subject matter (see MPEP 2144.05 II A - Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)).

With respect to claim 7, Abe teaches the laser device as outlined in the rejection to claim 6, and additionally teaches the second conductivity type second clad layer is formed of InGaAlP (col.5 lines 51-52), but does not teach the composition of the layer to be $\text{In}(0.5)(\text{Ga}(1-x)\text{Al}(x))(0.5)\text{P}$. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a material of $\text{In}(0.5)(\text{Ga}(1-x)\text{Al}(x))(0.5)\text{P}$ as the

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composition would be an obvious optimization of the taught subject matter (see MPEP 2144.05 II A - Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)).

With respect to claim 8, Abe teaches the laser device as outlined in the rejection to claim 1, as well as the use of a material to emit light at 650nm including a multiple quantum well and barrier layers (col.5 lines 43-58). Abe does not teach the use of between 5-9 layers of $\text{In}_{0.5}(\text{Ga}_{1-u}\text{Al}_u)_{0.5}\text{P}$ with $0 \leq u \leq .2$ and barrier layers of $\text{In}_{0.5}(\text{Ga}_{1-v}\text{Al}_v)_{0.5}\text{P}$ with $.2 \leq v \leq .6$ and a well thickness of 4-8nm. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the material of Abe emitting at 650nm with material having a composition and thickness of: between 5-9 layers of $\text{In}_{0.5}(\text{Ga}_{1-u}\text{Al}_u)_{0.5}\text{P}$ with $0 \leq u \leq .2$ and barrier layers of $\text{In}_{0.5}(\text{Ga}_{1-v}\text{Al}_v)_{0.5}\text{P}$ with $.2 \leq v \leq .6$ and a well thickness of 4-8nm, since the wavelength taught by Abe is emitted by this material, and the composition and thickness would be obvious optimizations of the taught subject matter (see MPEP 2144.05 II A - Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)).

With respect to claim 11, Abe teaches the structure outlined in the rejection to claim 1, as well as the material types outlined in the rejections to claims 6-8, and additionally teaches the integration of two lasers emitting at different wavelengths being integrated onto the same substrate (fig.5a). Abe does not teach the structure of claim 1

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combined with the material of claim 6 to be integrated onto the substrate (fig.5a LD1, non-pulsation) in addition to the disclosed structure (fig.5a LD2 and claim 1, self-pulsation). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the disclosed first structure (self-pulsation, claim 1) with the deemed obvious combination structure (claim 6) onto one substrate in order to allow for self-pulsation operation in both devices and the reduction of noise due to returned light (Abe, col. 1 lines 25-37).

Claim 12 is rejected for the same reasons outlined in the rejection of claim 2 above.

Claim 13 is rejected for the same reasons outlined in the rejection to claim 5 above.

Claim 14 is rejected for the same reasons outlined in the rejection to claim 6 above.

Claim 15 is rejected for the same reasons outlined in the rejection to claim 8 above.

With respect to claim 16, Abe teaches the dual wavelength laser structure as outlined in the rejection to claim 11, including the material types (col.5 lines 49-50, #39). Abe does not teach the specific composition of $\text{In}_{0.5}(\text{Ga}_{1-t}\text{Al}_t)_{0.5}\text{P}$ with $0.6 \leq t \leq 1$ or that the thickness be 0.15-0.45 μm . It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the material of Abe with material having a specific composition and thickness of: $\text{In}_{0.5}(\text{Ga}_{1-t}\text{Al}_t)_{0.5}\text{P}$ with $0.6 \leq t \leq 1$ or that the thickness be 0.15-0.45 μm , since the composition and thickness

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would be obvious optimizations of the taught subject matter (see MPEP 2144.05 II A - Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abe in view of Hatakoshi et al. (US 6400742).

With respect to claim 3, Abe teaches the laser device and ridge shape as outlined in the rejection to claim 1, but does not teach the width of the upper edge to be greater than the width of the lower edge or the side edges to narrow inward from the upper to lower edge. Hatakoshi teaches a device usable in a self-pulsation regime (col.36-37 lines 66-6) which comprises a ridge shaped such that the width of the upper edge is greater than the width of the lower edge and the side edges to narrow inward from the upper to lower edge (fig.35 #328). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the structure of Abe with the shape of Hatakoshi in order to reduce a series resistance of the device (Hatakoshi, col.29-30 lines 65-23).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohya in view of Hatakoshi et al. (US 6400742).

With respect to claim 10, Ohya teaches a method of fabricating a semiconductor laser element that exhibits self-sustained pulsation in a predetermined output region

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comprising the steps of: forming a first conductive type clad layer on a substrate; forming an active layer on said first conductive type clad layer; forming a second conductive type first clad layer on said active layer; forming a second conductive type second clad layer on said second conductive type first clad layer ([0026-27]); forming a stripe-shaped dielectric film on said second conductive type second clad layer; and using said dielectric film as a mask to etch said second conductive type second clad layer to form a stripe-shaped second conductive type second clad layer; wherein: an upper portion that is at least 60% of the top of said stripe-shaped second conductive type second clad layer is formed by etching ([0028], fig.1); and the cross-sectional surface of said stripe-shaped second conductive type second clad layer has an upper edge and a lower edge that face each other and side edges that connect between said first edge and said second edge, such that the minimum width thereof is at least 70% of the maximum width and the angle between said lower edge and each side edge of said upper portion is at least 70° but no more than 100° (see rejection to claim 1 above).

Ohya does not teach the etching mask to be of an oxide film or the etching type to be a dry etch. Hatakoshi teaches a method of fabricating a self-sustained pulsation device wherein an oxide mask and dry etching technique are used to form the ridge stripe region (col.7 lines 1-10). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the fabrication method of Ohya with the oxide mask and dry etch of Hatakoshi as oxide masking techniques are well known and widely used in the art, and dry etching allows for a more uniform, or controlled, edge to develop along the edges of the masked portion.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abe in view of Fujii (US 5822348).

With respect to claim 17, Abe teaches the self-sustained pulsed laser device as outlined in the rejection to claim 11, but does not teach the use of current blocking layers. Fujii teaches a self-sustained pulsed laser (fig.5) which includes the use of InGaAlP current block layers on either side of the second conductive type second semiconductor layer (fig.5 #207). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser device of Abe with the current block layers of Fujii in order to better limit the current injected into the active region and allow for a supersaturation absorption layer and superior self-pulsation operation (Fujii, col.5 lines 36-44), as well as the specified composition of $\text{In}_{0.5}(\text{Ga}_{1-w}\text{Al}_w)_{0.5}\text{P}$ with $0.7 \leq w \leq 1$ as the composition would be obvious optimization of the taught subject matter (see MPEP 2144.05 II A - Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)).

Conclusion

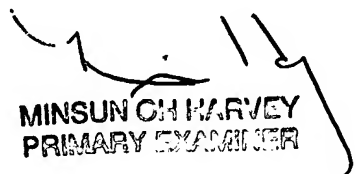
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVR


MINSUN CH HARVEY
PRIMARY EXAMINER